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POSTER

TITLE/AUTHOR	CODE
<i>Aspergillus flavus</i> Growth was Essential in Gathotan Fermentation, but Aflatoxin was not Produced Umi Purwandari, Hani S. El-Nezami, Ann C. Lawrie	P - 02
The Influence of Improperly used Frying Oil on Lipid Metabolism in Rats Ambar Rukmini	P - 03
Addition of Docosa Hexaenoic Acid and Arachidonic Acid into Food Formula to Improve the Intellectual Development of Severe Malnourished Children Astuti Lamid, Komari	P - 05
Potential of <i>Ipomoea batatas</i> L. Ethanol Extract in Lowering Blood Glucose Level in Diabetic Mice Evhy A., Khotib J., Taufik Hidayat M., Zulkhairi A., Mokhlas MAM., Andang M.	P - 07
<i>Theobroma cacao</i> Extract Blocks Stress Induced Hypotension in Rats Farah Idayu N., Taufik Hidayat M., Zulkhairi A., Hasnah B., Sharida F., Che Norma M.T., Moklas M.A.M., Khairul Kamilah A.K., Evhy A.	P - 08
Nutritional Composition and Toxicity Study of <i>Anacardium occidentale</i> Linn. using Brine Shrimp Lethality Test Fazali F., Zulkhairi A., Hasnah B., Khairul-Kamilah AK., Khairunnuur FA., Nursakinah I., Kamal NH., Zamree MS., Shahidan MA.	P - 09
Effect of Different Smoking Process on Smoked Sarden Quality Fronthea Swastawati, Sutanto, Eko Susanto	P - 10
The Influence of RMU (Rice Milling Unit) Parameter to the Rice Quality Heny Herawati	P - 12
Various Chicken Extract on Brine Fermentation to Produce Salt Soy Sauce by using Inoculum of <i>Aspergillus oryzae</i> Yetti Mulyati Iskandar, Agustine Susilowati, Aspiyanto	P - 14
Germinated Brown Rice as a Potential Hypocholesterolemic Agent Khairul Kamilah A.K., Zulkhairi A., Azrina A., Norhaizan M.E., Maznah I., Hasnah B., Sakinah I., Taufik Hidayat M., Mokhlas M.A.M., Khairunnuur F.A., Fazali F.	P - 15
Table of Nutrients Composition of Indonesian Foods Komari	P - 16
Antioxidant Activities of Cider and Jelly of Mangosteen Pericarp Mery Tambaria D. Ambarita, Herry Cahyana, Meylysa	P - 17

<p>Toxicity Assessment of Three Different Types of <i>Mitragyna speciosa</i> Extracts using Brine Shrimp Screening Test</p> <p>Mokhlas M.A.M., Adib Ridzuan N.R., Taufik Hidayat M., Zulkhairi A., Nasir F.I., Abdul Rahman S., Fakurazi S.</p>	P - 18
<p>Phytate, Iron, Zinc, Calcium Contents and Their Molar Ratios in Selected Raw and Prepared Foods Commonly Consumed in Malaysia</p> <p>Norhaizan Mohd. Esa, Nor Faizadatul Ain Ab Wahid</p>	P - 20
<p>Storage Stability of β - Carotene on Cassava Noodle Enriched with Yellow Pumpkin during Storage</p> <p>Supriyanto</p>	P - 21
<p>Rheological Properties of Exopolysaccharides Produced by <i>Streptococcus thermophilus</i> Strains and Their Role in Creation of Yoghurt Texture</p> <p>Umi Purwandari, Todor Vasiljevic</p>	P - 22
<p>Application of Computational Chemistry Method to Study the Antioxidant Activity of Vitamin E: Reactions of α-Tocopherol with the Hydroperoxy Radical</p> <p>Zaky Al-Fatony, Syahrul Khairi, Wurcak Wongkwai, Nathaya Selphusit, Hanggara Sudrajat</p>	P - 23
<p>Proteolytic Activity of <i>Aspergillus</i> sp-K3 in Recovery of Amino Acids as Savory Fraction through Brine Fermentation on Vegetable Broth of Mung Beans (<i>Phaseolus radiatus</i> L.)</p> <p>Agustine Susilowati, Aspiyanto, Yati Maryati</p>	P - 24
<p>Performance of Ultrafiltration Membrane in Concentrating Lactobacillus Acid Bacteria (LAB) Produced from Mung Beans (<i>Phaseolus radiatus</i> L.) as Probiotic Vegetable Broth</p> <p>Aspiyanto, Agustine Susilowati, Yati Maryati</p>	P - 25
<p>The Antioxidative Effect of <i>Anacardium occidentale</i> Linn. (AO) Leaf Aqueous Extract in Oxidised Huvec Cell Lines</p> <p>M. Kamal N.H., Taufik Hidayat M., Zulkhairi A., Moklas M.A.M., Hasnah B., Khairul Kamilah A.K., Khairunnuur F.A., Fazali F., Nur Amalina I., Nur Izzati M.N.</p>	P - 26
<p>Effect of <i>Theobroma cacao</i> on Mice Exposed to Forced Swim Test (TST) and Tail Suspension Test (TST)</p> <p>Taufik Hidayat M., Farah Idayu N., Zulkhairi A., Moklas M.A., Hasnah B., Sharida F., Khairul Kamilah A.K., Evhy A.</p>	P - 27
<p>A Study of GMP (Good Manufacturing Practices) Implementation in Cooling, Cutting, and Packaging Process at a "Lapis Legit" Industry in Semarang</p> <p>Alfonsus Dwianto Wibowo, Fifi Sutanto-Darmadi, Inneke Hantoro</p>	P - 28

18	Food Security Survey and Environmental Pest Management in Hamadan Province, Iran <i>Mahdi Reyahi Khoram</i>	P - 30
20	The Effects of Palm Oil Addition and Meat Washing on the Quality Properties of Low-Fat Duck Sausage <i>Nurul Huda, Noryati Ismail, Muhammad Syahmi, Muthia Dewi</i>	P - 32
21	The Effect of Thickening Agents on the Textural Properties of Guava Fruit Leather <i>Devi Anggraini, Kristina Ananingsih, Inneke Hantoro</i>	P - 33
22	Optimization of Headspace Gas Chromatography with Flame Ionization Detector (HS/GC-FID) for the Analysis of Benzene in Beverages <i>Dyah Styarini and Oman Zuas</i>	P - 34
23	Good Manufacturing Practice Model for Ganyong Starch Sme at Gunungkidul, Yogyakarta <i>Crescentiana D. Poeloengasih, Prima Ditahardiyani</i>	P - 35
24	Antioxidative Effects of <i>Anacardicum occidentale</i> Linn. in Diabetic Rats <i>Zulkhairi A., Nur Amalina I., Taufik Hidayat M., Moklas M.A.M., Hasnah B., Khairul Kamilah A.K., Khairunnuur F.A., Fazali F., M. Kamal N.H., Nur Izzati M.N</i>	P - 36

SESSION

THE EFFECT OF THICKENING AGENTS ON THE TEXTURAL PROPERTIES OF GUAVA FRUIT LEATHER

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ABSTRACT

Most tropical fruits cannot be kept for a substantial period of time and thus easily rot. Drying is one common method to prolong its shelf life. Guava is known for its high nutrient contents, especially vitamin C. Guava Leather is an example of a food product made from guava puree with the addition of sucrose, citric acid and thickening agent; molded to an approximate 2.00 mm thickness; and then dried at 70°C for 9 hours until a thin skin-like layer is formed. Citric acid is added to maintain the flavour and acidity of the product, and also to control Maillard browning. Sucrose is responsible for giving the body and the sweet taste to the product. Thickening agents are added to substantially modify the product's properties, such as taste, texture, and thickness. Thickening agents also increase the product stability and improve suspending action. The objective of this research was to study the effect of thickening agents on the textural properties of Guava Leather. Thickening agents used in this research were guar gum, xanthan gum, and maltodextrin in 0.3%, 0.4%, and 0.5% concentrations. The thickeners strongly affected texture among samples. Each thickener used produced its own textural characteristics to the Guava Leather. Objective tests on Guava Leather including chewiness, cohesiveness, and springiness tests were done using Texture Analyzer TA Lloyd Plus. The results demonstrate the effects of treatment on the chewiness, cohesiveness, and springiness of Guava Leather. Guava Leather with the addition of thickening agents tends to have a greater chewiness, cohesiveness, and springiness than the product without the thickening agent. Guava Leather with the greatest cohesiveness is Guava Leather with the addition of 0.4% of xanthan gum and the greatest chewiness and springiness are with the addition of 0.4% of guar gum as the thickening agent.

Keywords: *Guava Fruit Leather, Thickening Agent, Guar Gum, Xanthan Gum, Maltodextrin*

INTRODUCTION

Most tropical fruits cannot be kept for a substantial period of time and thus easily rot. Guava is known for its high nutrient contents, especially vitamin C. Consuming more fruit has been symbolic for the trend of a healthy life style. Restructured fruit, such as fruit leather, can be an economic and convenient value-added substitute for natural fruits as a source of a variety of nutrient elements, especially vitamin C. In addition, it can also be a useful outlet for low-grade fruits and by products from other processes using fruits. Furthermore, fruit leather, has far less calories (<100 kJ per serving) than many other snacks (Huang & Hsieh, 2005).

Thickening agents (Maltodextrins, Xanthan Gum, and Guar Gum) are substances which, when added to an aqueous mixture, increase its viscosity without substantially modifying its other properties. Maltodextrins are easily dispersed into water or other aqueous-based systems. Maltodextrins are used as crystallisation inhibitor. It prevents sweets appearing and extend the shelf life. Xanthan Gum is a natural biopolymer produced by fermentation process from the bacterium *Xanthomonas campestris*. Xanthan gum is used to keep ingredients suspended uniformly and provide thickening to enhance a formulation's mouth feel. Guar Gum is a galactomannan

obtained from the seed kernel of the guar plant *Cyamopsis tetragonoloba*. It is a versatile thickener and stabilizer used in bakery and confectionary products (Imeson, 1999).

The objective of this research was to study the effect of thickening agents on the textural properties of Guava Leather.

MATERIAL AND METHODS

Red guava were purchased from local market for the experiment. The first step was washing of guava to remove dirt, soils, and foreign materials. Then, it were trimmed and steam blanched for three minutes. After that, the guava were crushed, the seeds and skins were separated from guava puree by filtration. Sugar content of the puree was measured with brix refractometer and added with sucrose until 23°Brix. to the puree to give some sour flavor. Guava puree then poured into the mold at approximate 2mm thickness and dehumidied for about 8 to 10 hours at 70°C until the moisture content 10-15%. Thickening agents used in this research were guar gum, xanthan gum, and maltodextrin in 0.3%, 0.4%, and 0.5% concentrations. springiness). The moisture content was measured with moisture analyzer. The guava leather were cut and analyzed with texture analyzer TA Lloyd Plus to test 3 TPA profiles (chewiness, cohesiveness, and springiness)

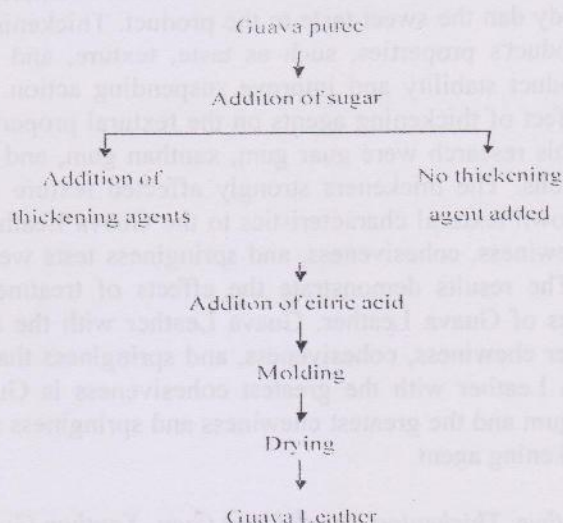


Figure 1. Guava Leather Production Flowchart

RESULTS AND DISCUSSION

The results demonstrate the effects of treatment on the TPA properties of Guava Leather.

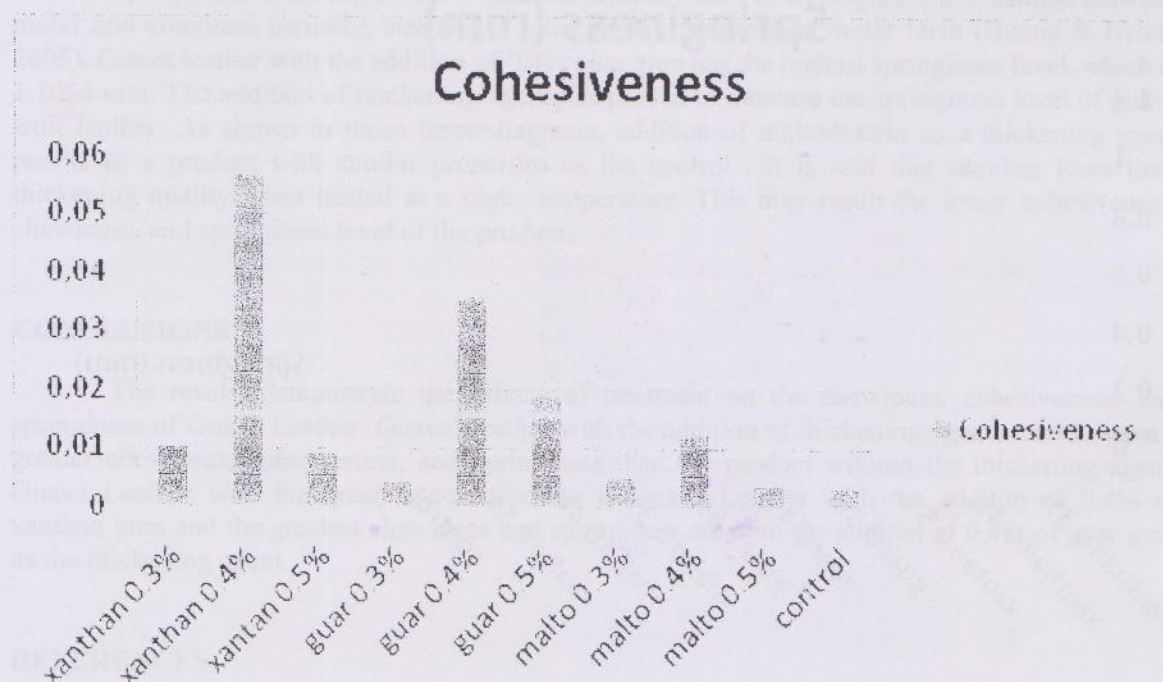


Figure 2. Effect of Thickening Agents on The Cohesiveness Level of Guava Leather

Cohesiveness is the strength of the internal bonds making up the food. Guava leather with the addition of 0.4% xanthan gum has the greatest cohesiveness level, which is 0.0566. The control Guava leather has the lowest cohesiveness level. This shows that addition of xanthan gum in the making process of guava leather produces end product with higher internal strength compared to other thickening agent. According to the result, it can be concluded that addition of xanthan gum as a thickening agent results to a tougher end product because of one feature of xanthan gum solution is its viscoplasticity, which gives a high yield value even at low concentrations that may stabilise dispersions of xanthan emulsions. Xanthan solutions are stable over a wide range of pH and can be used in formulations containing acetic, citric, or phosphoric acid (Imeson, 1999).

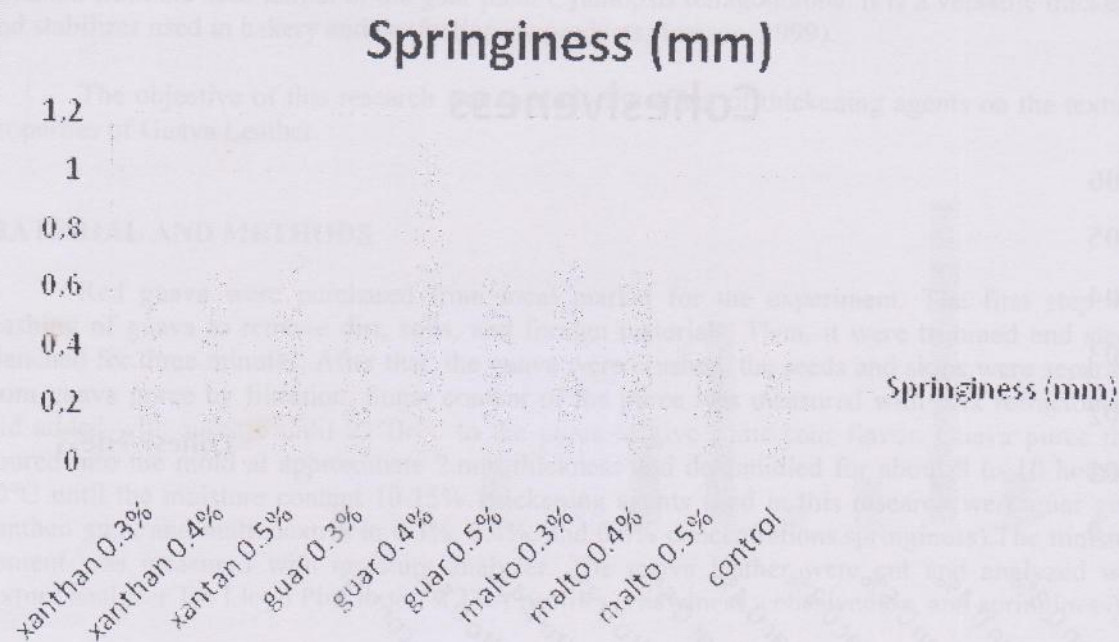


Figure 3. Effect of Thickening Agents on The Chewiness Level of Guava Leather

Chewiness is the energy required to chew a solid food until it is ready for swallowing. Guava leather with the addition of 0.4% guar gum has the highest chewiness level, which is 0.0612 kgf.mm. The difference is substantial compared to the control. Overall, the diagram shows that addition of thickening agents results in the increase of chewiness level. Addition of maltodextrin as thickener results a less chewy end product compared with xanthan gum and guar gum.

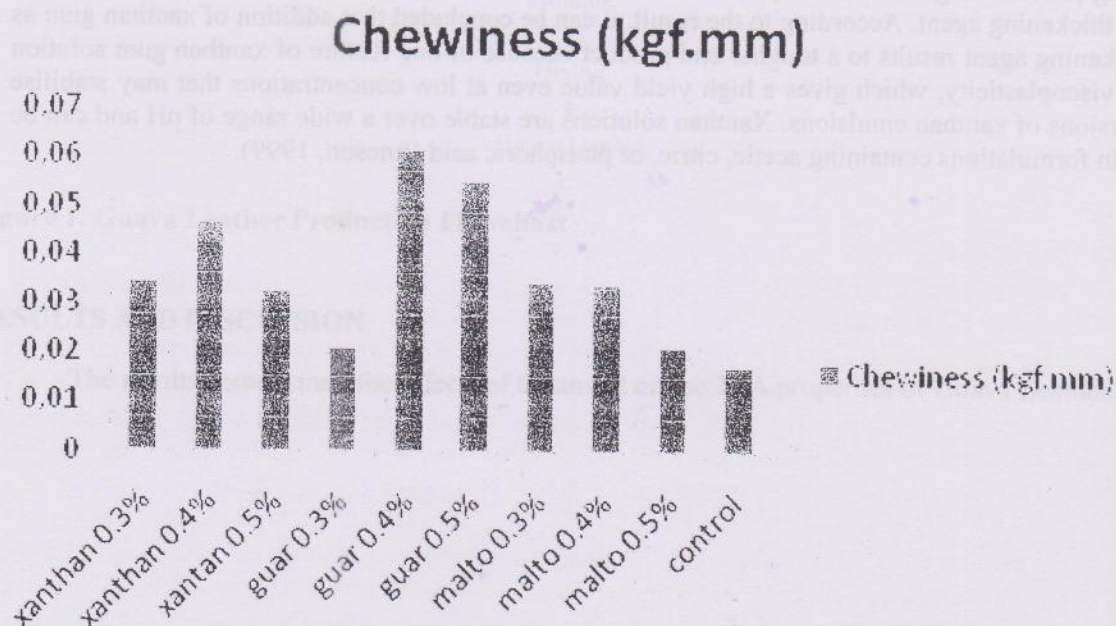


Figure 4. Effect of Thickening Agents on The Springiness Level of Guava Leather

Springiness is the force with which the sample return to its original place sample between molar and compress partially; size/shape, after partial compression molar teeth (Huang & Hsieh, 2005). Guava leather with the addition of 0.4% guar gum has the highest springiness level, which is 1.1054 mm. The addition of thickening agent has proven to increase the springiness level of guava fruit leather. As shown in those three diagrams, addition of maltodextrin as a thickening agent results to a product with similar properties as the control. It is said that starches loses their thickening quality when heated at a high temperature. This may result the lower cohesiveness, chewiness, and springiness level of the product.

CONCLUSIONS

The results demonstrate the effects of treatment on the chewiness, cohesiveness, and springiness of Guava Leather. Guava Leather with the addition of thickening agents tend to have a greater chewiness, cohesiveness, and springiness than the product without the thickening agent. Guava Leather with the greatest cohesiveness is Guava Leather with the additon of 0.4% of xanthan gum and the greatest chewiness and springiness are with the additon of 0.4% of guar gum as the thickening agent.

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